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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,856	01/12/2004	Maurice Gell	UCT-0040	8424

23413 7590 04/18/2007

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EXAMINER	
SAVAGE, JASON L	
ART UNIT	**PAPER NUMBER**
1775	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/755,856	GELL ET AL.	
	Examiner	Art Unit	
	Jason L. Savage	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *15 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-31,33-52,59,60 and 63* is/are pending in the application.

4a) Of the above claim(s) *1-15, 32, 53-58, 61-62* is/are withdrawn from consideration.

5)☒ Claim(s) *63* is/are allowed.

6)☒ Claim(s) *16-23,26-31,33-40,43-52,59 and 60* is/are rejected.

7)☒ Claim(s) *24,25,41 and 42* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 16-31, 33-52 and 59-60 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation that the splats have an average diameter of "greater than about 0.1 micrometer" is not described in the specification and is considered new matter which should be removed from the claims.

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 16-23, 26-31, 33-40 and 43-52 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Padture et al. (Acta Mater. 49 (2001) 2251-2257 – article "Towards Durable Thermal Barrier Coatings with Novel Microstructures Deposited by Solution Precusor Plasma Spray)

With respect to claims 16-18 Padture discloses a thermal sprayed coating comprising containing novel microstructures (abstract). Padture further teaches that one such microstructure that is produced is a relatively large polycrystalline particle (~600nm) which contains grains of sizes 50-100 nm (p. 2255, Discussion – last paragraph). As such Padture would meet the claim limitation wherein the polycrystalline particle is a splat which has a size within the claimed range. In the alternative, it would have been obvious.

With respect to claims 19-21 and 29 Padture discloses that the coating is porous and may have a porosity of 16.4% (p. 2253, Results) and since the structure is a microstructure, the pores are considered less than micrometer sized.

With respect to claims 22-23 and 39-40, although Padture does not explicitly recite the coating have at least one interpass boundary, it teaches that the sprayed coating may conventionally be used as a Thermal Barrier Coating which is typically applied to a alumina surface of a bond coat (p. 2255 – Discussion). It is the position of the Examiner that the alumina coating would meet the limitation of being an interpass boundary. Regarding the thickness as recited in claims 23 and 40, although Padture is silent to the thickness, the alumina formed layer would be relatively thin. Absent a teaching of the criticality of showing of unexpected results, the claimed thickness would not provide a patentable distinction over the prior art.

With respect to claims 26-27 and 47, Padture teaches the coating have at least one vertical crack (p. 2255 – Discussion and Figure 2(a)). Regarding claims 27 and 47, the cracks appear to have lengths equal to the thickness of the coating (Figure 2(a)).

With respect to claims 28, 30 and 48, Padture teaches the coating thickness may be 250 micrometers and the crack spacing is between 100-300 micrometers which meets the claim limitations (p. 2252 – Processing and p. 2254 – Results and Figure 2(a)).

With respect to claims 31, 33-36, the coating of Padture is a thermal barrier comprising a yttria stabilized zirconium oxide comprising 7 percent by weight of yttria (p. 2252 - Processing).

With respect to claims 37-38, 43-45, 49-52, as previously set forth above, Padture teaches a thermal barrier coating having splats within the claimed size range, thickness of 250 micrometers, vertical cracks and porosity of 16.4%.

With respect to claim 46, the porosity in the coating of Padture would be three dimensional.

Claims 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padture et al. (Acta Mater. 49 (2001) 2251-2257 – article "Towards Durable Thermal Barrier Coatings with Novel Microstructures Deposited by Solution Precusor Plasma Spray) as applied to claims 16-23, 26-31, 33-40 and 43-52 above, further in view of Chow et al. (US 2002/0031658).

Padture teaches what is set forth above but it is silent to forming a coating having the claimed splat structures wherein the porosity is 10% or less. Chow discloses a method thermal spray coating employed fine droplets which form aggregate splat microstructures having a dimensions smaller than those using powder feedstock (par.

[0024]). Chow further teaches that the coatings may be subjected to post deposition techniques which allow for tailoring and adjustment of the coating properties including the porosity (par. [0039]). It would have been within the purview of one of ordinary skill in the art to have recognized that the porosity of the coating of Padture could be adjusted from 16.4% to other porosity values in order to tailor the material to be suited for the application in which it will be used. Absent a teaching of the criticality or showing of unexpected results when the porosity of the claimed coating is 10% or less, it would not provide a patentable distinction over the prior art of Padture as modified by Chow.

Allowable Subject Matter

Claim 63 is allowed.

Claims 24-25 and 41-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 2-15-07 have been fully considered but they are not persuasive.

First Claim Rejection

Applicant argues that Padture fails to teach or suggest the claimed splat size since Padture discloses that the most important feature of the formed coating is the absence of horizontal splats. Applicant further argues that based on the Declaration of

Dr. Maurice Gell, the "rounded" aggregate shown in Figure 4(a) would not meet the limitation of being a splat having the claimed dimensions. Dr. Gell further states that the material shown Figure 4(a) was obtained by crushing an SPPS-deposited TBC and placing the resulting particles on a fine mesh grid and then placed in a TEM. The TEM shows a random polycrystalline grain structure in the aggregate of Padture whereas the splats formed in the present process appear as a columnar-grain structure which results from the nucleation of many grains at the interface between newly arriving molten splat and the previously deposited and solidified splats.

This argument is not commensurate in scope with the claims as they contain no limitations drawn to a columnar-grain structure or that the structure results from the nucleation of many grains at the interface between newly arriving molten splat and the previously deposited and solidified splats. The specification also does not appear to contain teachings of forming columnar-grain structures.

Regarding Dr. Gell's assertion that the "rounded" aggregate show in Figure 4(a) would not meet the limitation of being a splat having the claimed dimensions, the argument is not persuasive. The polycrystalline particle having a size of ~600nm would have the claimed dimensions and would meet the limitation of being a splat such as is defined in the specification.

Regarding the statement that the material show in Figure 4(a) was obtained by crushing an SPPS-deposited TBC and placing the resulting particles on a fine mesh grid, the teaching on p. 2255 in the last paragraph of column 2 that relatively large polycrystalline particles are formed from the SPPS deposition method. Regardless of

what method was used to depict and/or measure the particle size, it would not change that particles of the claimed size are formed in the coating.

Regarding the teaching in Padture that an important feature of the coating is the 'absence of horizontal splats', the present invention is silent to the splats being horizontal. Furthermore, the only disclosure of horizontal splats in the specification is in figure 2B which is described as structure formed by conventional thermal spraying. The structures shown in Figures 2C, 3 and 4 of solution plasma spray-deposited coatings do not appear to exhibit horizontal splats. As such, Applicant's noting of Padture teaching the absence of horizontal splats does is not persuasive in overcoming the rejection to the claims.

Second Claim Rejection

Applicant argues that Chow teaches that the splat sizes disclosed are either greater than 2 microns such as formed by conventional thermal spraying processes or less than about 0.1 micron such as formed by Chow. As such, Applicant argues that Chow teaches particle sizes outside of the claimed range. However, as was set forth above, Padture teaches forming splat particles having sizes within the claimed range.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason Savage
4-12-07

JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
4/10/7